RYABININ, Yu.N.

Reasons for increased plasticity under high hydrostatic pressure.
Fiz. tver. tela 1 no.6:960-962 Je '59. (MIRA 12:10)

1.Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR.
(Plasticity)

SOV/179-59-1-19/36

AUTHORS: Beresnev, B. I., Vereshchagin, L. F., Ryabinin, Yu. N.(Moscow)

TITLE: The Extrusion of Metals by a Liquid Under High Pressure (O vydavlivanii metallov zhidkost'yu, nakhodyashcheysya pod vysokim davleniyem)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1959, Nr 1, pp 128-131 (USSR)

ABSTRACT: The paper is a continuation of earlier work (Ref.2). Extrusion of a metal by a liquid under high pressure is an improvement over extrusion by a plunger, since much of the friction at the walls of the container is eliminated. Experiments were carried out on aluminium AD-I, copper M-2, duralumin D-1M and alloy AMG. The degree of deformation was measured as

$$\phi = (D^2 - d_o^2) \, 1 \, D^2 \quad ,$$

or as

$$\varepsilon_f = \ln(D^2/d_o^2) \quad ,$$

where D is the initial diameter of the metal cylinder, and d_o is the diameter of the extruded metal. Curves are given

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The Extrusion of Metals by a Liquid under High Pressure

for ϕ and S_f as functions of pressure and the effect of the angle of the cone which reduces the diameter from D to d_0 is also investigated. Microhardness measurements on copper extruded by the plunger method and by the liquid pressure method show that the copper produced by the latter method is the more uniform. There are 4 figures, 1 table and 8 Soviet references.

SUBMITTED: April 14, 1958.

SOV/126-7-2-13/39

25(1), 18(6), 18(7)
AUTHORS: Beresnev, B. I., Vereshchagin, L. F. and Ryabinin, Yu.N.

TITLE: Change in the Mechanical Properties of Non-Ferrous Metals and Alloys in the Process of Extrusion by a High Pressure Liquid (Izmeneniye mekhanicheskikh svoystv tsvetnykh metallov i splavov pri vydavlivanii ikh zhidkost'yu vysokogo davleniya)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 2, pp 247-253 (USSR)

ABSTRACT: Metal was used for the investigation which had undergone various degrees of deformation by liquid-extrusion as well as by plunger extrusion. The method used for the extrusion of metals by liquid has been described by Beresnev et al. (Ref 5). In order to compare results, an instrument for extruding metals by a plunger was made. Specimens in the form of rods of definite length were made for tensile testing from the metal thus treated. Prior to testing the specimens were gripped in tong-like grips. The distance between the grips was kept at 10 d_o (d_o being the diameter of the specimen prior to testing and being 2-4 mm). Testing was carried out in a specially designed tensile testing machine at 4 mm/min. The force

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Change in the Mechanical Properties of Non-Ferrous Metals and Alloys in the Process of Extrusion by a High Pressure Liquid

applied to the specimen was registered at various stages of testing with an accuracy of up to 0.7 kg. The elongation of the specimen was registered by pointers with an accuracy of up to 0.01 mm. The diameter of the specimen before and after fracture was measured by a micrometer with an accuracy of up to 0.005 mm. The elongation tests enabled the change in mechanical properties (σ_B - yield strength, $\sigma_{0.2}$ - yield point, ψ_k - reduction in area) on cold deformation to be established for specimens having undergone various degrees of preliminary deformation for the two methods of extrusion. Considerable attention was paid to the change in microstructure of extruded articles. Micro-sections were made of specimens which had been deformed to various degrees by the two extrusion methods, and microhardness tests were carried out in a PMT-3 machine (Ref 7). In order to avoid work hardening, the sections were electrolytically polished by a method suggested by Popilov et al. (Ref 6). The following metals were

Change in the Mechanical Properties of Non-Ferrous Metals and Alloys in the Process of Extrusion by a High Pressure Liquid

studied:- aluminium AD1 (0.25% Fe, 0.29% Si), copper M2 (99.76% Cu) and the alloy AMG (3.89% Mg, 0.36% Fe, 0.52% Si). The materials were annealed prior to deformation. The properties of the metals in their original condition are shown in a Table (p 248). The graphs of Figs 1, 2 and 3 show changes in mechanical properties of AD1, M2 and AMG specimens having undergone a preliminary deformation by high pressure liquid extrusion. In Fig 1 the change in σ_B for AD1, M2 and AMG with increase in the extent of preliminary deformation ψ_{np} is shown. In Fig 2 the change in $\sigma_T^{0.2}$ for the above three alloys with increase in the extent of ψ_{np} is shown. In Fig 3 the change of coefficient of reduction of area ψ_k for the above alloys with increase in degree of ψ_{np} is shown. Fig 4 is a photomicrograph of copper, deformed by liquid-extrusion under high pressure:- a - annealed Cu; b - ψ_{np} = 0.5;

Card 3/5 B - ψ_{np} = 0.712. In Fig 5 the distribution of micro-

Change in the Mechanical Properties of Non-Ferrous Metals and Alloys in the Process of Extrusion by a High Pressure Liquid

hardness H_μ along the cross sections of Cu rods, liquid-extruded at various degrees of preliminary deformation through a die with an entry angle of $22^\circ 30'$, is shown. (D - rod diameter, d - diameter of the cross section). 1 - annealed metal; 2 - liquid extrusion $\phi_{np}=0.5$; 3 - liquid extrusion $\phi_{np} = 0.624$; 4 - liquid extrusion $\phi_{np} = 0.712$. In Fig 6 the distribution of H_μ along the cross section of Cu rods extruded by two methods through a die with an entry angle of $22^\circ 30'$ is shown:- 1 - extrusion by liquid $\phi_{np} = 0.5$; 2 - extrusion by plunger $\phi_{np} = 0.5$. In Fig 7 the distribution of H_μ along the cross section of Cu rods (d - diameter of cross section of liquid-extruded rods, $\phi_{np} = 0.5$ const) extruded through dies with different angles:- 1 - $\alpha = 5^\circ$; 2 - $\alpha = 60^\circ$; 3 - $\alpha = 22^\circ 30'$; 4 - $\alpha = 40^\circ$; 5 - annealed metal. As a result of the above experiments, the authors have arrived at the following conclusions:

Card 4/5 1. Cold deformation of metals in liquid-extrusion under

Change in the Mechanical Properties of Non-Ferrous Metals and Alloys in the Process of Extrusion by a High Pressure Liquid

high pressure increases their strength, whilst preserving their plasticity.
2. The mechanical properties obtained after cold deformation, which are evident in tensile testing, are identical for both extrusion methods.
3. The distribution of deformation along the cross section of a liquid-extruded rod is more uniform than that of a plunger-extruded one.
4. The shape of the instrument influences the distribution of deformation in the liquid-extrusion of metals. It has been found that there are optimum die angles for obtaining a uniform deformation along the cross section of a rod and the best surface properties of the metal.
There are 7 figures, 1 table and 9 Soviet references.

ASSOCIATION: Laboratoriya sverkhvysokikh davleniy AN SSSR (Laboratory for Super-Pressures, Ac.Sc. USSR)

SUBMITTED: February 14, 1958

28 (5)

AUTHORS: Beresnev, B. I., Vereshchagin, L. F., SOV/32-25-6-30/53
Ryabinin, Yu. N.

TITLE: Method of Investigating the Effect of the Hydrostatic Pressure Upon the Mechanical Properties of Deformed Metals (Metod izucheniya vliyaniya gidrostaticheskogo davleniya na mekhanicheskiye svoystva prodeformirovannykh metallov)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 6, pp 736-737 (USSR)

ABSTRACT: The effect of pressure upon the other mechanical properties of metals which were exposed to an intensive plastic deformation under high pressure is of special interest. For these investigations a method was suggested in the present case which provides a compression of the metal under universal hydrostatic pressure. Compression takes place in a special device (Fig 2) into which the container for the high pressure is fitted (Fig 1). The latter is divided into two vacuums; the sample is inserted in such a manner that it forms sort of conical stopper between the two vacuums. The mode of operation consists in a slow pressure release of the liquid filled into the two vacuums under high pressure in the lower vacuum; thus a difference in pressure between the two

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vacuums occurs which causes a compression of the sample (as it is between the two vacuums) and a plastic flow takes place in the sample. A hydraulic compressor was used for this purpose (10000 atm) and aluminum AD 1 samples were investigated. With increasing compression pressure also the plasticity of aluminum increases (Fig 3, Diagram) which was found in an extension of the sample under normal pressure following the compression. There are 3 figures and 2 Soviet references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy Akademii nauk SSSR (Laboratory of Physics of Ultra High Pressure of the Academy of Sciences, USSR)

5(4) SOV/76-33-3-9/41

AUTHORS: Markevich, A. M., Tamm, I. I., Ryabinin, Yu. N.

TITLE: The Role of Chilling in the Reaction of the Synthesis of Nitrogen Oxide I (Rol'zakalki v reaktsii sinteza okisi azota. I)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 3, pp 559 - 565 (USSR)

ABSTRACT: The physical importance of chilling is shown by the example of the synthesis of nitrogen oxide and the role of chilling rate of the combustion products is pointed out. In the reaction $O_2 + N_2 \rightleftarrows 2\,NO - 43$ kcal (1) in the presence of an excess quantity of oxygen a temperature rise will favor the reaction (in the first phase) towards the right, whereas in the case of chilling (in the second phase) the decomposition reaction is favored. If in the case of high temperatures the reaction rate (RR) is sufficiently high, the NO-concentration approaches the equilibrium value. Chilling in the second phase of the process (Fig 1) will lead to a still greater deviation of the NO-concentration from the equilibrium value in order to remain constant at a temperature T_1. In publications this

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phenomenon is called chilling. In order to obtain a precise explanation of the conditions of cooling the connection between the (RR) of the NO-decomposition and the rate of variation of the equilibrium concentration are taken into account at different stages of cooling, and the two entirely different processes of reaction are determined. The transition from one reaction are determined. The transition from one reaction phase into the other is denoted by several critical values of chilling rate and determines the phase of chilling. There are 3 figures and 2 Soviet references.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki (Academy of Sciences, USSR, Institute of Chemical Physics)

SUBMITTED: April 24, 1957

5(4) SOV/76-33-4-3/32

AUTHORS: Markevich, A. M., Tamm, I. I., Ryabinin, Yu. N.

TITLE: The Part Played by Quenching in the Reaction of the Synthesis of the Nitrogen Oxides.II.(Rol' zakalki v reaktsii sinteza okisi azota.II)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 4, pp 764-770 (USSR)

ABSTRACT: In continuation of a previous paper (Ref 1) a number of data from publications on investigations of the nitrogen oxide synthesis under various experimental conditions is explained in this paper. The paper which contains the corresponding diagrams and tables is divided into the following chapters: natural cooling of the reaction products in closed reaction vessels. Experiments in apparatus with an intensive cooling. Experiments in adiabatic apparatus. Determinations in flow apparatus. It was found that all data which were obtained under most different conditions may be considered from one viewpoint and therefore determinations may be made with experimental data from two completely different conditions of reaction. In one case the rate of the direct synthesis reaction is insufficient, in the other, the rate of cooling of the reaction products is low. In the experimental data investigated the

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SOV/76-33-4-3/32

The Part Played by Quenching in the Reaction of the Synthesis of the Nitrogen Oxides II

NO-yield is determined mainly by the rate of cooling. Experiments which took place under an intensive cooling were successful only in two cases: in the method of membrane destruction (Ref 12) and in experiments on an adiabatic apparatus (Ref 15) where a strong increase of the rate of cooling and a corresponding increase in the NO-yield was attained. There are 5 figures, 2 tables, and 19 references, 13 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR Institut khimicheskoy fiziki Moskva (Academy of Sciences of the USSR Institute of Chemical Physics Moscow)

SUBMITTED: July 23, 1957

Card 2/2

PHASE I BOOK EXPLOITATION SOV/4750

Beresnev, B.I., L.F. Vereshchagin, Yu.N. Ryabinin, and L.D. Livshits

Nekotoryye voprosy bol'shikh plasticheskikh deformatsiy metallov pri vysokikh davleniyakh (Some Problems of Large Plastic Deformations of Metals at High Pressures) Moscow, Izd-vo AN SSSR, 1960. 79 p. Errata slip inserted. 3,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki vysokikh davleniy.

Resp. Ed.: S.I. Ratner, Doctor of Technical Sciences; Ed. of Publishing House: K.P. Gurov; Tech. Ed.: L.A. Lebedeva.

PURPOSE: This booklet is intended for technical personnel engaged in the extrusion of metals.

COVERAGE: The booklet presents a summary and analysis of the results of experiments in the investigation of plastic deformation of metals under high pressures. These experiments were conducted during the last few years at the Institut fiziki vysokikh davleniy AN SSSR (Institute of the Physics of

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Some Problems of Large Plastic Deformations (Cont.) SOV/4750

High Pressures of the Academy of Sciences USSR) as part of a program for studying the physics of solids under high pressures. F.F. Voronov, V.A. Shapochkin, and Ye. V. Zubova collaborated with the authors in carrying out experiments at the instutute. The authors discuss the effect of hydrostatic pressures on the plasticity of metals, the flow of metals in extrusion by high-pressure liquid, the mechanical properties of metals extruded by this method, and the use of this method in the extrusion of fancy shapes and tubing. There are 52 references: 47 Soviet, 4 English, and 1 German.

TABLE OF CONTENTS:

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S/120/60/000/005/021/051
E191/E381

AUTHORS: Vereshchagin, L.F., Semerchan, A.A., Isaykov, V.K. and Ryabinin, Yu.N.

TITLE: Small-size Laboratory Hydraulic Press for 1 000 tons

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 5, pp. 93 - 95

TEXT: A new press is described, designed and made at the Institute of High-pressure Physics of the AS USSR. The distinguishing feature is the use in the pressure cylinder of a pressure up to 5 000 atm as compared with a maximum of 800 atm in industrial presses. The Vereshchagin compressor (Ref. 1) delivering 0.8 litres/hour at 10 000 atm makes this possible (the latest Vereshchagin compressor delivers 80 litres/hour at 6 000 atm). The press has two cylinders of 160 mm bore and 50 mm stroke, and works with glycerin.\ The cylinders face each other and are backed by bridge plates tied with four columns. The free span between columns is 250 mm. The maximum daylight of the press is 450 mm between the plunger faces when furthest apart. The weight of the press is 6 tons. The cylinder body screws into rings resting against the bridge plates but the

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Small-size Laboratory Hydraulic Press for 1 000 tons

cylinder also fits into the bridge plates in a taper bore. The high-pressure seal" of the piston is made up of alternating PVC and fabric reinforced laminated plastic washers. The seal" operates on the principle of unbalanced areas which maintains a pressure on the sealing washers in excess of the working pressure. The pressure faces of the pistons are at the end of projections of smaller diameter working in rings screwed into the open end of the cylinder bore. The differential area between the projection and the piston serves to actuate the reverse stroke. Calibration of the press by means of Amsler dynamometer capsules shows that friction losses do not exceed 3%. The deformation of the press components under pressure was measured with dial gauges up to a cylinder pressure of 5000 atm and found to be linear. In operation a constant load could be maintained during several hours without replenishment of the working liquid.

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E191/E381

Small-size Laboratory Hydraulic Press for 1 000 tons

There are 4 figures, 1 table and 1 Soviet reference.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR (Institute of High-pressure Physics of the AS USSR)

SUBMITTED: August 7, 1959

Card 3/3

S/193/60/000/007/003/012
A005/A001

1.5200

AUTHORS: Vereshchagin, L. F., Semerchan, A. A., Isaykov, V. K., Ryabinin, Yu. N.

TITLE: A Hydraulic Press of 1,000-t Force

PERIODICAL: Byulleten' tekhniko-ekonomicheskoy informatsii, 1960, No. 7, pp. 15-17

TEXT: The Institut fiziki vysokikh davleniy AN SSSR (Institute of Physics of High Pressures of the Academy of Sciences USSR) developed and produced a hydraulic press of 1,000-t force with the operational pressure in the cylinder up to 5,000 kg/cm^2, which is provided for by the hydrocompressor K-6 (K-6) of the L. F. Vereshchagin-system with the delivery of 0.8 l/hr at the pressure of 10,000 kg/cm^2, which was also produced by the Institute. The design of the press is presented in the figure. Two equal thickwalled cylinders 1 and 2 of steel of the brand 45XHMФA (45KhNMFA) have 160 mm diameter and can operate together as well as separately. Their external surfaces 3 are conical with 5° summary angle and can be deformed under the operation pressure of the liquid by up to 0.1 mm. These radial forces are transmitted to the traverse 4 abolishing the deformation of the cylinder walls. Nut 5 transmits a partial press force immediately into the cylinder walls for supporting, the rest into the traverse through the nut face. The press piston 6

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87006
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A005/A001

A Hydraulic Press of 1,000-t Force

consists of the piston proper, the piston head 7, the set of vinyl-chloride- and textolite-packing rings, a nut, and a tie bolt. Incompensated areas ensure the pressure in the packings higher than the operation pressure. The reversal of the piston is effected by liquid supply into the cavity 8 sealed by packings in the piston and cylinder. The press traverses are connected by 4 columns.
Technical characteristics of the press:

Operating liquid:	technical glycerin, oil CY (SU)
Overall-sizes:	
Height	2,000 mm
Width	800 mm
Distance between the columns diametrically	550 mm
Clearance between the columns	250 mm
Weight	6 t

The calibration test of the friction in the cylinder yielded the maximum friction loss of 3%.

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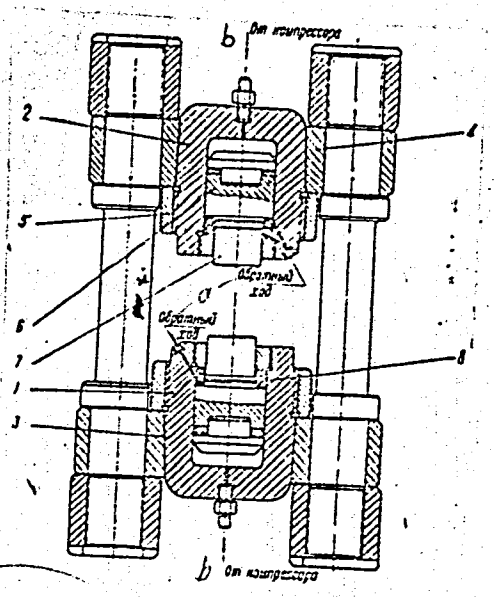
A005/A001

A Hydraulic Press of 1,000-t Force

Figure:
Hydraulic press of 1,000-t force
a = reversal of the piston
b = supply from the compressor



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88007

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B019/B056

1 1200

AUTHORS: Beresnev, B. I., Vereshchagin, L. F., Ryabinin, Yu. N.

TITLE: Conditions of Flow and Change in the Mechanical Properties of Metals During Their Extrusion by High Pressure Liquid

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 12, pp. 43-48

TEXT: Experiments are reported of carrying out metal extrusion directly by means of a high-pressure liquid, without using intermediate elements. The authors built a test device, by means of which experiments under pressures of up to 10,000 atm were carried out. The selection of the liquid plays an important part, and in Table 1 results obtained by previous experiments on commercial-grade aluminum of the type АД 1(AD1) (99.3% Al, 0.7% Fe+Si+Cu) are given. The extrusion pressures of a number of metals are given in Table 2. From experiments concerning the most favorable conditions obtainable it followed that the most favorable inlet angle for all metals investigated here is about 15° (45° in extrusion with conventional methods), which is much more favorable for conditions of

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Conditions of Flow and Change in the Mechanical Properties of Metals During Their Extrusion by High Pressure Liquid

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B019/B056

friction. Further, a considerable decrease of extrusion pressure from 18,000 kg/cm^2 to 4,500 kg/cm^2 was observed, as well as an improvement of the tensile strength of from 10.9 to 18 kg/mm^2, and a considerably more uniform distribution of microhardness over the cross section of the material extruded by this method. The surface quality is also better than in the case of a conventional method. There are 4 figures, 2 tables, and 5 references: 4 Soviet and 1 German.

ASSOCIATION: Institut fiziki vysokikh davleniy, g. Moskva (Institute of the Physics of High Pressures, Moscow). Institut fiziki metallov AN SSSR, g. Sverdlovsk (Institute of the Physics of Metals, AS USSR, Sverdlovsk)

SUBMITTED: January 30, 1960

S/126/60/009/02/030/033
E111/E335

AUTHOR: Ryabinin, Yu.N.

TITLE: Contribution on the Equation of State of Solids at Super-high Pressures

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 312 - 314 (USSR)

ABSTRACT: Using Bridgman's data (Refs 5-11), the author (Ref 3) has determined the values in the equation of state for solids at super-high pressures and constant temperature. The equation was proposed by the author (Ref 3) and others (Refs 1,2) and found applicable in the range 5000 to 100 000 kg/cm^2 (Ref 3); its applicability for higher pressures (Ref 4), which was in doubt, has now been verified with the aid of data published by Walsh et al (Ref 12). The good agreement with experimental data is shown in the figure.
There are 1 figure and 12 references, 4 of which are Soviet and 8 English.

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S/126/60/009/05/013/025
E021/E335

AUTHORS: Livshits, L.D., Genshaft, Yu.S. and Ryabinin, Yu.N.

TITLE: The Polymorphic Transformation of Cerium Under Pressure

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 5, pp 726 - 732 (USSR)

ABSTRACT: Experiments were carried out by the method of displacement of a piston in apparatus for measuring the volume compressibility of solid bodies (Figure 1). This consists of a hydraulic press, a piston and a piezometric device, together with measuring apparatus. Cerium of three compositions was used - Nr 1 contained La $<$ 0.01%, Nd $<$ 0.5%, Pr $<$ 0.5%, Fe $<$ 0.02% ; Nr 2 was that used in earlier work (Ref 2); Nr 3 contained La $<$ 0.3%, Nd $<$ 0.75%, Pr $<$ 0.75%, Fe $<$ 0.1%. Curves of displacement of the piston ΔH against the force F were drawn and these are reproduced in Figure 2. These show that there is a strongly expressed hysteresis effect. In the region of the phase transformation the pressure of transformation p_n is determined as the mean arithmetic value of p_1 and p_2, where p_1 and p_2 correspond to

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The Polymorphic Transformation of Cerium Under Pressure

the transition from one phase to another with increasing and decreasing pressure. From a series of measurements curves of temperature against p_n were obtained for the three types of cerium (Figure 3). These are straight lines parallel to one another. They show that an increase in purity leads to a decrease in the pressure of transformation at a given temperature and an increase in temperature of transformation at a given pressure. The "real" hysteresis can be found by carrying out experiments with different hydrostatic conditions to allow for the effect of friction. Electrical resistance measurements can be used to show polymorphic transformations. Figure 4 shows a curve of electrical resistance against pressure for cerium Nr 1. This shows a hysteresis at 20.5 °C of 1 600 kg/cm^2. Further experiments showed that "real" hysteresis was 1 550 kg/cm^2. Figure 5 shows the change in the total hysteresis with temperature. An increase in temperature decreases the width of the hysteresis loop. At 200 °C the width of the "real" hysteresis loop is less

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E021/E335

The Polymorphic Transformation of Cerium Under Pressure

than the experimental error. It is further shown that at temperatures greater than 280 °C and pressures greater than 18 500 kg/cm^2 no change in volume, i.e. no phase transformation of the first order, can take place. There are 5 figures and 10 references, 6 of which are English, 1 French and 3 Soviet.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR (Institute of High-pressure Physics of the Ac.Sc., USSR)

SUBMITTED: November 24, 1959

Card 3/3

Ryabinin, Yu.N.

S/126/60/010/01/016/019
E032/E514

AUTHORS: Ryabinin, Yu.N., Rodionov, K.P. and Alekseyev, Ye.S.

TITLE: An Estimate of Certain Physical Characteristics of Strongly Compressed Metals

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.1, pp. 150-152

TEXT: Since a quantum mechanical theory of solids subjected to high pressure has not yet been developed, physical characteristics of such solids must be estimated with the aid of the classical models put forward by Debye (Ref.1), Grüneisen (Ref.2) and Lindemann (Ref.3). It is well known that the characteristic frequency ν of oscillations in a crystal lattice and hence the Debye temperature also, increases with pressure. For an isotropic body the Debye temperature is given by

$$\Theta_D = \frac{hc}{R}\left(\frac{3N}{4\pi V}\right)^{1/3} \qquad (1)$$

where c is the mean velocity of propagation of elastic vibrations in an isotropic body. This velocity in turn depends

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E032/E514

An Estimate of Certain Physical Characteristics of Strongly Compressed Metals

on the elastic moduli so that if the latter are known as functions of pressure, then the Debye temperature given by Eq.(1) can be estimated. Other physical characteristics such as specific heat, melting point, thermal expansion coefficient etc. can then be expressed in terms of the Debye temperature. This approach is used in the present paper to calculate the Debye temperature as a function of pressure for aluminium, silver, copper and iron and the melting point as a function of pressure for iron and aluminium. The results obtained are shown in Figs. 1 and 2. In Fig.2 the continuous line represents the experimental results obtained by Strong (Ref.11) and Butuzov (Ref.12) and the dotted line shows the theoretical results obtained by the present authors. The agreement is good and hence it is concluded that the classical models employed lead to correct estimates for the parameters of a solid body as functions of pressure. Acknowledgments are made to R.G.Arkhipov for discussions and advice. There are 2 figures and 12 references, 2 of which are Soviet, 3 German and 7 English.

VC

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S/126/60/010/01/016/019
E032/E514

An Estimate of Certain Physical Characteristics of Strongly Compressed Metals

ASSOCIATIONS: Institut fiziki vysokikh davleniy AN SSSR (Institute of High Pressure Physics, AS, USSR) and Institut fiziki metallov, AN SSSR (Institute of Physics of Metals, AS, USSR)

SUBMITTED: February 6, 1960

VC

Card 3/3

RYABININ, Yu.N.

Effect of pressure on some properties of solid bodies. Zhur. tekhn. fiz. 30 no.6:739-741 Je '60. (MIRA 13:8)

1. Institut fiziki vysokikh davleniy AN SSSR.
(Solids) (Pressure)

84659

1.1210 only 2108
5.1600 only 1273,1043

S/020/60/135/001/011/030
B006/B056

AUTHORS: Vereshchagin, L. F., Corresponding Member of the AS USSR, Ryabinin, Yu. N., Preobrazhenskiy, A. Ya., and Stepanov, V. A.

TITLE: Growth of Metal Monocrystals Under High Hydrostatic Pressure

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 1, pp. 45-47

TEXT: The growth of metal monocrystals at high pressures is of interest above all because, on the basis of thermodynamic considerations, it must be assumed that the higher the pressure, the lower will be the inclination for forming structural defects. The assumption based on theory that with pressure the regularity of the lattice increases, requires experimental verification, which was the aim of the authors of the present paper. In this, the authors directed their attention also upon the fact that by the action of pressure, the properties of the crystals may undergo an essential change. Al and Zn monocrystals were grown from a melt. The melt

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Growth of Metal Monocrystals Under High Hydrostatic Pressure

S/020/60/135/001/011/030
B006/B056

was in a conical graphite container, which was especially well suited, because in it (in the furnace) a temperature gradient of 7 - 10 deg/mm could be well produced. Cooling of the melt was effected by lowering the electric power applied to the furnace. This was arranged in such a manner that the front of the crystallization temperature moved with 0.5 - 0.7 mm/min (at 10,000 atm), by which the rate of crystal growth was determined. First, monocrystals were grown in a vacuum and nitrogen- and argon media (normal pressure), the method being studied and the operation of the furnace watched. These crystals were produced at 0.3 kw (Zn) and 0.8 kw (Al) respectively during a time of 100 and 150 min, respectively. It was found that the electric power used had to be increased approximately linearly with pressure and amounts to 10,000 atm (N_2 or Ar) 1.8 and 3.0 kw, respectively. Under these conditions, the time of growth of a Zn monocrystal is 280 min, and for Al monocrystal 480 min. The experiments were carried out under constant and also not variable pressure. The authors assume that the crystals grown under variable pressure contain less gas than those grown under constant pressure. Growing under constant pressure required a special compensation of the temperature-dependent pressure change; the deviations from the constant pressure value were about $\pm$50 atm.

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84659

Growth of Metal Monocrystals Under High Hydrostatic Pressure

S/020/60/135/001/011/030
B006/B056

The crystal structure was subjected to X-ray examination; the results obtained by these examinations are intended to be published in a later paper. There are 2 figures and 20 references: 12 Soviet, 2 German, 4 US, and 2 British.

ASSOCIATION: Institut fiziki vysokikh davleniy Akademii nauk SSSR (Institute of Physics of High Pressures of the Academy of Sciences USSR)

SUBMITTED: July 7, 1960

X

Card 3/3

21137

15 8500 1573, 1137
11.2214

S/190/61/003/004/012/014
B101/B207

AUTHORS: Livshits, L. D., Genshaft, Yu. S., Markov, V. K., Ryabinin, Yu. N.

TITLE: Compressibility and phase diagram of polytetrafluoro ethylene at high pressure

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 4, 1961, 624-629

TEXT: This paper deals with the study of the behavior of polytetrafluoro ethylene (fluoroplast-4, teflon) at high pressure and high temperature considering the fact that this material is widely applicable in high-pressure engineering. Moreover, measurements were made in a wider range of temperature and pressure than listed by the published data available. The following parameters were determined: 1) the volume compressibility in the piezometer according to the piston displacement method. The error of pressure measurement was ± 150 kg/cm^2; the error of volume decrement determination was less than 5%. By means of the apparatus described in Ref. 6 (L. D. Livshits et al., Fizika metallov i metallovedeniye (Metal Physics and Metallography). Metallurgizdat, Sverdlovsk, 9, 726, 1960), pressures

up to 30,000 kg/cm^2 and temperatures up to 300°C could be reached. 2) The linear compressibility was measured by a recording method similar to that developed by P. W. Bridgman (Ref. 7, see below). Measurement was carried out under hydrostatic conditions. Teflon rods, 57 and 200 mm long, density 2.21 g/cm^3 served as samples. 3) The isobaric measurement of the thermal expansion of teflon at different pressure was measured with the same apparatus. The phase diagram, Fig. 2, was plotted on the basis of the data obtained. The phases were denoted according to C. E. Weir (Ref. 2, below). The triple point of the diagram lies at 5000 kg/cm^2 and 66°C. The Table shows the volume decrements $\Delta v/v_o$ at different pressure and temperature. The following was found: 1) The compressibility of phase III is considerably smaller than that of I and II. 2) The polymorphic transition from II to III (at 20°C) is accompanied by a jump of volume change by 2%. The transition from I to II (at 90°C) is accompanied by a jump of volume change by 2%. Fig. 3 indicates that the jump in volume change decreases with increasing temperature. The blurredness of the II-III transitions due to hysteresis may be reduced if the sample is kept for 1 hr at constant pressure. 3) Between 30-100°C and up to 4000 kg/cm^2 pressure in phase I small jumps were observed in the linear and volume compressibility, that were ir-

reproducible and due to several superimposing crystalline transformations of teflon. 4) These irregularities and the curvature of the I-II transition curve indicates the presence of a further singular point at 65°C and 4000 kg/cm^2. There are 3 figures, 1 table, and 8 references: 1 Soviet-bloc and 7 non-Soviet-bloc. The 4 references to English language publications read as follows: P. W. Bridgman, Proc. Amer. Acad. Arts and Sci., 76, 3, 55, 1948; C. E. Weir, J. Res. NBS, 50, no. 2, 1953, R. P. 2395; R. J. Beecroft, C. A. Swenson, J. App. Phys., 30, 1793, 1959; P. W. Bridgman, Proc. Amer. Acad. Arts and Sci., 58, 165, 1923.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR (Institute of High-pressure Physics, AS USSR)

SUBMITTED: August 17, 1960

Fig. 2. Phase diagram of teflon. Legend: o) data obtained by means of piston displacement; Δ) data of linear compressibility at constant temperature; x) data of isobaric measurement; ----: hysteresis.

S/126/61/011/004/020/023
E073/E535

188200 1413, 1454, 1418, also 2108

AUTHORS: Ryabinin, Yu. N., Beresnev, B. I. and Demyashkevich, B. P.

TITLE: Change in the Magnetic Properties of Iron Deformed by Extrusion with a Liquid Under High Pressure

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4, pp. 630-633

TEXT: Recent investigations of Bridgman and the authors of this paper have shown the effectiveness of the method of extrusion of metals with liquid under high pressure on changing the mechanical properties of metals. So far, no data were available on the mechanical properties of metals extruded by applying a degree of deformation which considerably exceeds the limit contraction in the neck of tensile test specimens. The work described in this paper was carried out to elucidate this problem. The method used was the same as described in an earlier paper (Ref.3). Since the upper limit of pressures was 10 000 kg/cm^2, successive extrusion was applied for obtaining larger degrees of deformation, i.e. metal that has already been deformed was used for producing specimens for

the next extrusion experiments. The extrusion was by means of dies with an entry cone of 15°, the pressure applied at each stage was approximately 6000 kg/cm^2, using as a working medium a mixture of kerosene (1/3rd) and transformer oil (2/3rds). The metal was then used for producing tensile test specimens. This enabled determining the mechanical properties of iron after various degrees of preliminary deformation. In addition polished sections were produced for studying the structure and also for measuring the microhardness along the cross-section. Pure commercial iron (C - 0.07%) was deformed in 15 passes to an extent of $S_f = \ln (F/f_o) = 3.88$ (F - initial cross-section of the blank, f_o - final cross-section of the rod). The limit plasticity of the iron in the annealed state, determined by tensile tests was S_f=1.76. Thus, it was possible to determine the mechanical properties of the metal at degrees of deformation which were 2.2 times as large as those corresponding to the limit plasticity under atmospheric pressure. The results have shown that with increasing preliminary deformation the strength of the metal increases but its ductility decreases. Fig.1 shows characteristic tensile test curves for

specimens of commercial iron with preliminary deformations of S_f = 0, 0.784, 2.06 and 3.88 (curves 1 to 4 respectively), K, kg vs. $\Delta\ell$, mm. Fig.2 shows the changes in these characteristics and in the microhardness as functions of the preliminary deformation S_f. It can be seen that with increasing S_f the strength characteristics increase appreciably. Thus, the strength of iron can be increased from 35 kg/mm^2 (S_f = 0) to 98 kg/mm^2 (S_f = 3.88). The character of these dependences leads to the conclusion that although the intensity of work hardening decreases with increasing deformation, there is a possibility of further increasing the strength of the metal. Photographs of polished specimens show that during the process of deformation the ferrite grains stretch in the direction of flow of the material and there is a predominance of intracrystalline deformation right up to the highest values of S_f. Admixtures which in the annealed state are distributed along the grain boundaries are intensively broken up but remain distributed along the grain boundaries. There are 4 figures and 4 Soviet references.

Card 3/3

Inst. High Pressure Physics AS USSR

ADADUROV, G.A. (Moskva); DREMIN, A.N.(Moskva); PERSHIN, S.V. (Moskva); RODIONOV, V.N. (Moskva); RYABININ, Yu.N. (Moskva)

Shock wave compression of quartz. PMTF no.4:81-89 Jl-Ag '62. (MIRA 16:1)

(Shock waves) (Compressibility) (Quartz)

S/207/62/000/005/003/012
B108/B186

AUTHORS: Genshaft, Yu. S., Livshits, L. D., Ryabinin, Yu. N. (Moscow)

TITLE: Determination of the phase parameters of solid bodies at high pressures by using the method of shifting a piston

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1962, 107-116

TEXT: The known method by P. W. Bridgman (The Physics of High Pressure. London, 1949; The Compression of 46 Substances to 50,000 kg/cm^2. Proc. Am. Acad. Art. Sci., 1940, v. 74, no. 3) to determine the compressibility of solid bodies at 30,000 kg/cm^2 within the temperature range from 20 to 150°C is explicitly described. On the basis of experimental data, corresponding calculations were made for Pb, AgCl, CsCl, pyrophyllite, lithographic limestone, graphite, BN, Bi, and Tl. By means of this method data on the melting of substances under pressure can be derived from the discontinuity of volume, and the phase diagrams can be studied over wide ranges of temperature and compression. The temperature coefficient of volume expansion (β), depending on pressure, was determined for Pb, AgCl, graphite, BN, Tl, and Bi (Table 7). There are 1 figure and 7 tables.

Determination of the phase...

SUBMITTED: July 11, 1962

Legend to Table 7: (1) p, kg/cm^2; (2) graphite

(1) p, кГ/см²	5·10⁴							
	Pb	AgCl	(2) графит	BN	Tl	Bi		
	20—123°C	17—132°C	21—134°C	23—139 °C	22—133 °C	25—160 °C	по [1, 2]	
							0	30—75 °C
1	90	28	25	35	92	40	40	40
5000	80	—21	25	20	88	23	32	38
10000	71	—56	21	9	85	22	27	46
15000	58	—74	15	1	80	32	22	62
20000	44	—73	8	—2	74	58	24	86
25000	45	—55	—5	—2	69		22	125
30000	37	—20		3	62			

Card 2/2

ACCESSION NR: AT4035834 S/2534/64/000/024/0091/0098

AUTHOR: Ryabinin, Yu. N.; Rodionov, V. N.; Dremin, A. N.

TITLE: Possibilities of polymorphic transitions under shock-wave compression

SOURCE: AN SSSR. Komitet po meteoritam. Meteoritika, no. 24, 1964. Trudy* Desyatoy Meteoritnoy konferentsii v Leningrade 29 maya-1 iyunya 1962 g., 91-98

TOPIC TAGS: silica, meteorite, coesite, meteorite crater, polymorphic transition, high pressure geophysics, quartz coesite transition, stichovite

ABSTRACT: The structure and physical properties of coesite are discussed, together with the quartz-coesite transition and the entire history of discovery of silica modifications. Much of this introductory discussion is based on American sources. Such a transition was discovered by S. M. Stishov and S. V. Popova in the USSR in 1961. They discovered a new silica modification having a density 64% higher than quartz. It was formed artificially at a static pressure of 160,000-180,000 kg/cm^2 and a temperature of 1200—1400C and had a density of 4.35 g/cm^3. It crystallizes in a tetragonal structure of the rutile type and has very high refractive indices. Under ordinary conditions it is metastable; when heated to 900C at atmospheric pressure, it undergoes a transition to cristobalite. Various finds of coesite in meteor craters are described, and there is a discussion of ex-

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ACCESSION NR: AT4035834

periments made to determine the possibility of formation of coesite under natural conditions at high pressures and temperatures. The authors undertook such an experiment to achieve a quartz-coesite transition under the influence of a shock wave; an effort was made to determine at exactly what pressure the transition would occur. Determination of the pressure and corresponding temperature of this transition made it possible to estimate the minimum velocity of flight of a meteorite at the time of its impact against the earth's sandstone surface at which the formation of coesite would occur. The mathematical solution of this problem is presented. It is shown that a polymorphic transition with a large jump in density is possible during an extremely brief application of high pressure and temperature (of the order of 10^{-6} sec). The authors then attempt to estimate the mass and velocity of a meteorite on the basis of the size of the crater formed. Indirect methods are required, owing to an inadequate knowledge of the properties of rocks and soils. The primary method used is comparison of the craters of explosions and meteor craters, which outwardly appear very similar. An expression is derived giving the dependence of the radius of a crater on the momentum of the falling body. An estimate was made of the minimum velocity of the meteorite forming the Wabar meteorite crater. The value determined was 2 km/sec; the maximum mass of the meteorite determined from the formulas presented was 1000 tons. The cited formulas are correct for relatively small craters with a radius not greater than about 100 m. Orig. art. has: 12 formulas, 3 figures, and 1 table.

Card 2/3

3/3

ACCESSION NR: AT4035834

ASSOCIATION: Komitet po meteoritam, Akademiya nauk SSSR (Committee on Meteorites, Academy of Sciences SSSR)

SUBMITTED: 00	ATD PRESS: 3077	ENCL: 00
SUB CODE: ES, AA	NO REF SOV: 009	OTHER: 012

L 10660-63
EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD

ACCESSION NR: AP3001209 S/0078/63/008/006/1302/1306

AUTHOR: Livshits, L. D.; Genshaft, Yu. S.; Ryabinin, Yu. N. 56 54

TITLE: Phase diagram of crystal hydrates $MgSO_4$ at high pressures

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 6, 1963, 1302-1306

TOPIC TAGS: phase diagram, crystal hydrates of $MgSo_4$, polymorphic transition, phase transitions, $MgSO_4$

ABSTRACT: A phase diagram of the crystal hydrates of $MgSO_4$ was constructed from measurements obtained by the "piston displacement" method; data was obtained at 20 degrees by volume compressibility of salts which were previously dehydrated at 200 degrees. A polymorphic transition in the region of 4500 kg/sq.cm. pressure was discovered. The phase transition in the crystalline hydrates is sensitive to the quantity of water of crystallization; by decreasing the content of bonded water, the discontinuities in the volume upon compression are blurred, down to a complete disappearance of separate transitions. There is a limit in the piston displacement method above which the liberated water interferes with the measurement of change in volume decrease with pressure. Actual crystalline conditions of the salt under pressure can be studied by X-rays, but it may be assumed that

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L 10660-63
ACCESSION NR: AP3001209

2

significant volume change with the transitions indicates important structural changes in the material. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of chemical Physics, Academy of Sciences SSSR). Institut fiziki Zemli Akademii nauk SSSR (Institute of Earth Physics, Academy of Sciences SSSR)

SUBMITTED: 28May62 DATE ACQD: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 004 OTHER: 003

kes
Card 2/2

RYABININ, Yu.N.; PETROV, V.P.; MARKOV, V.K.; LIVSHITS, L.D.; DELITSIN, I.S.

Additional data on the conditions governing the formation of the dense modifications of silica at high pressures and temperatures. Izv. AN SSSR.Ser.geol. 28 no.8:3-10 Ag '63. (MIRA 17:2)

1. Institut fiziki Zemli AN SSSR i Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moskva.

RYABININ, Yu. N

L 16301-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 IJP(c)/ASD/L MJW/
ACCESSION NR: AP4046094 JD/HW/JT S/0126/64/018/003/0437/0442

AUTHOR: Bulv*chev, D. K.; Beresnev, B. I.; Gaydukov, M. G.; Marty*nov, Ye. D.; Rodionov, K. P.; Ryabinin, Yu. N.

TITLE: Healing porosity and cracks in metals by plastic deformation under high hydrostatic pressure

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 3, 1964, 437-442

TOPIC TAGS: metal defect, hydrostatic pressure, defect healing

ABSTRACT: Experiments have been conducted to explore the possibility of eliminating defects in metals with high hydrostatic pressure. The M2 copper specimens with artificial defects such as microcavities and microcracks were subjected to a hydrostatic pressure of up to 100,000 atm. Compression on accompanied by plastic deformation was found to have no effect on the number or size of defects, since it created mainly elastic deformation and only an insignificant amount of plastic deformation. However, when defective specimens were subjected to a tensile test under hydrostatic pressure, the defects were either

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L 16301-65
ACCESSION NR: AP4046094

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entirely eliminated or was reduced in size to such an extent that they could not be discovered by optical microscope and did not effect adversely mechanical properties of the metal (see Fig. 1 of the Enclosure). The intensity of defect healing increases with the increasing pressure and plastic deformation. Orig. art. has: 4 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AN SSSR); Institut fiziki zemli AN SSSR (Institute of Physics of Earth, AN SSSR)

SUBMITTED: 20Nov63 ENCL: 01 SUB CODE: MM

NO REF SOV: 009 OTHER: 002

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L 16301-65
ACCESSION NR: AP4046094

ENCLOSURE: 01

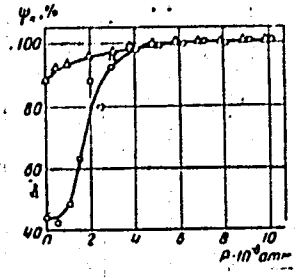

Fig. 1. Ductility of sound (1) and defective (2) specimens of M2 copper versus hydrostatic pressure

Card 3/3

RYABININ, Yu.N.; RODIONOV, V.N.; DREMIN, A.N.

Possibilities of polymorphic transitions during shock compression. Meteoritika no.24:91-98 '64. (MIRA 17:5)

1c

L 18318-65 EWT(m)/EWA(d)/EWP(t)/[illegible] /EWP(k)/EWP(b) Pf-4 IJP(c) JD/HW
ACCESSION NR: AP5001248 S/0126/64/018/005/0778/0783

AUTHOR: Beresnev, B. I.; Bulychev, D. K.; Gaydukov, M. G.; Martynov, Ye. D.; Rodionov, K. P.; Ryabinin, Yu. N.

TITLE: Healing of pores and cracks in copper by extrusion with a high-pressure fluid

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 5, 1964, 778-783

TOPIC TAGS: copper, copper defect, metal defect, density defect healing

ABSTRACT: The healing of microscopic pores and cracks in metal by plastic deformation has been investigated. Specimens of sound copper and copper with artificially produced pores and cracks were hydrostatically extruded or drawn with a 5—68% reduction at room temperature. Both methods of deformation increased the tensile and yield strengths, reduction of area, and density of both sound and defective specimens; extrusion did so to a greater extent than drawing (see Figs. 1 and 2 of the Enclosure). The mechanical properties and density of defective copper changed slightly with small reductions (5—8%) but increased appreciably with increasing reduction; with a reduction of 40% they

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ACCESSION NR: AP5001248

2

practically equalled those of the sound copper, evidently due to the elimination of pores and cracks. In drawing, the strength of defective copper at a reduction of 75% decreased, probably because the metal began to fail. Examination of the microstructure showed the number of pores decreases with increasing reduction, regardless of the deformation method. However, the pores completely disappeared after a 40% reduction by extrusion, but still remained after a 60—70% reduction by drawing. Orig. art. has: 3 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, AN SSSR); Institut fiziki Zemli AN SSSR (Institute of Physics of the Earth, AN SSSR)

SUBMITTED: 22Nov63 ENCL: 02 SUB CODE: MM

NO REF SOV: 006 OTHER: 004 ATD PRESS: 3155

Card 2/4

DELITSIN, L.S.; LIVSHITS, L.D.; MARKOV, V.K.; PETROV, V.P.; RYABININ, Yu.N.

Plastic deformation of quartz under superhigh pressure. Izv. AN SSSR. Ser. geol. 29 no.10:114-121 O '64.

(MIRA 17:11)

1. Institut fiziki Zemli AN SSSR i Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moskva.

L 18839-65 EEC(b)-2/EPF(c)/EPF(n)-2/EPR/EPA(w)-2/EWG(k)/EWP(k)/EWT(l)/EWT(m)/
EEC(t)/EWP(b)/EPA(sp)-2/T/EWA(m)-2/EWA(d)/EWP(t) Pf-4/Pi-4/Po-4/Pr-4/Ps-4/
Pu-4/Pz-6/Pab-10 AFETR/ASD(p)-3/AEDC(a)/ASD(f)-2/AFWL/AS(mp)-2/ESD(gs)/ESD(t)/
IJP(c) GG/AT/RM/WW/JD/HW/JG

ACCESSION NR: AP4049031 S/0057/64/034/011/1913/1932

AUTHOR: Ryabinin, Yu.N.; Rodionov, K.P.; Alekseyev, Ye.S. B

TITLE: Some concepts relating to the behavior of solid bodies under pressure

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.11, 1964, 1913-1932

TOPIC TAGS: solid state physics, high pressure, elastic property, thermodynamic characteristic, state equation, phase transition, electron shell

ABSTRACT: The paper is a selective review of experimental data and classical theoretical derivations relating to the behavior of solids at high pressures. An exhaustive review is not attempted, but rather a certain generalization of some problems of the volume-elastic behavior of solids. Thermodynamic properties are first considered, and the behavior under pressure of the entropy, energy, free energy, Debye temperature, heat capacity, and melting point is discussed. In the discussion of the Debye temperature and quantities depending on it, it is assumed that Poisson's ratio is independent of pressure. Following this, a number of equations of state are discussed. It is pointed out that at accessible pressures the energy of compression may exceed the heat of sublimation and become comparable with the ini-

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Inst. fiziki Zemli AN SSSR, Moscow (MIRA

ACCESSION NR: AP4049031

2

zation energy. The compressibilities and atomic volumes of the elements are plotted against atomic number at several pressures up to 5 x 10^5 kg/cm^2. The data were obtained partly from direct experiment and partly by extrapolation with the aid of an equation of state. As the pressure increases, the periodic variations of the compressibility and atomic volume become less marked. It is curious that at sufficiently high pressures the alkali metals cease to be the most compressible elements, and this distinction passes to the alkaline earths. Phase changes are discussed in the third and final section, together with the influence of pressure on the electron band structure. As the lattice ions approach each other under the influence of pressure, the electron bands widen and eventually overlap. This leads to changes in chemical properties. The authors, however, do not consider it entirely accurate to speak of an essentially new chemistry of high pressure, as did T.Hall (J.Wash.Acad.Sci.47,9,300,1957). Finally, at very high pressures not yet attainable in the laboratory, all the energy bands are expected to cross completely. The atoms will then no longer have their individual electron shells and the material will be in a state that the authors characterize as that of a "solid cold plasma". Orig.art.has: 58 formulas, 8 figures and 1 table.

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ACCESSION NR: AP4049031

ASSOCIATION: none

SUBMITTED: 21Jan64 ENCL: 00

SUB CODE: SS NR REF SOV: 020 OTHER: 035

3/3

ACCESSION NR: AP4010755 S/0020/64/154/001/0086/0087

AUTHOR: Livshits, L. D.; Ryabinin, Yu. N.; Beresnev, B. I.; Marty*nov, Ye. D.

TITLE: A new relationship between the elastic limit and pressure

SOURCE: AN SSSR. Doklady*, v. 154, no. 1, 1964, 86-87

TOPIC TAGS: elastic limit, high pressure metallurgy, axial tension of materials, rate of deformation

ABSTRACT: The authors have investigated the elastic limits of various steels and of brass under high pressure. The ir method of investigation differs from that previously used by a very high rate of deformation. The elastic limit E (the natural logarithm of the ratio of areas of the specimen cross sections before and after rupture) was measured as a function of pressure p. In the previous work (mainly by Bridgman), a proportionality between E and p has been

Card 1/2

ACCESSION NR: AP4010755

found in many metals and alloys. It is shown in the present work, that in some materials there is a relationship of a new type between E and p. At lower pressures, there is almost no effect of p on E. The rate of axial deformation has no effect on the dependence of the elastic limit on pressure. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki Zemli im O. Yu. Shmidta Akademii Nauk SSSR (Institute for the Earth Physics).

SUBMITTED: 05Apr63 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: PH, ML NO REF SOV: 003 OTHER: 001

Card 2/2

L 27188-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 IJP(c) JD/HW/JG
ACCESSION NR: AP5005241 S/0057/65/035/002/0348/0354

26
20
B

AUTHOR: Livshits, L. D.; Ryabinin, Yu. N.; Beresnev, B. I.

TITLE: Effect of pressure on the ductility of metals 14

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no.2, 1965, 348-354

TOPIC TAGS: chromium, chromium ductility, hydrostatic pressure, ductility pressure dependence 21

ABSTRACT: To determine the effect of high hydrostatic pressure on the ductility of metals, specimens of pure forged chromium were subjected to tensile tests at ambient hydrostatic pressures of up to 18,000 kg/mm^2. The curves of the ultimate deformation-pressure dependence showed that pressures of up to 4000—5000 kg/mm^2 have little or no effect on the ultimate elongation, but with a further increase in the pressure the elongation sharply increases. An analysis of the results showed that similar behavior is exhibited by a number of other brittle and low-ductility metals. The metal grain size appears to have no effect on the ε-p dependence. This indicates the major role of the condition of grains and the secondary importance of grain boundaries. To obtain a more exact evaluation of the effect of individual deformation-pressure factors, further investigation is required. Orig. art. has: 6 figures. [MS]

Card 1/2

L 27188-65

ACCESSION NR: AP5005241

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta AN SSSR, Moscow (Institute of Physics of the Earth, AN SSSR)

SUBMITTED: 09Mar64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 002 ATD PRESS: 3191

Card 2/2

L 49284-65 EWT(m)/EWP(k)/EWA(c)/T/EWP(b)/EWA(d)/EWP(w)/EWP(t) Pf-4 IJP(c)
ACCESSION NR: AP5011530 JD/BW UR/0020/65/161/005/1077/1080

AUTHOR: Livshits, L. D.; Beresnev, B. I.; Ryabinin, Yu. N.

TITLE: Ductility of the 50 at% Bi-50 at% Sn alloy in tension under a high pressure

SOURCE: AN SSSR. Doklady, v. 161, no. 5, 1965, 1077-1080

TOPIC TAGS: bismuth alloy, tin containing alloy, alloy ductility, pressure ductility relationship, brittleness/ductility transition

ABSTRACT: Binary Bi-Sn alloy containing 50 at% Bi was air cooled or water quenched, naturally aged, and then subjected to tension tests at room temperature at pressures up to 21,600 kg/cm^2. At 300—350 kg/cm^2 the alloy fracture was brittle. With a further increase in pressure the fracture became more and more ductile. In the 1400—1500 kg/cm^2 range the alloy ductility sharply increased, the elongation reached 6.5%, and the reduction of area was 99.9%. With a further increase in pressure the alloy ductility decreased, passed through a minimum at a pressure of 6500 kg/cm^2, increased again to the second maximum at a pressure of 10,000—11,000 kg, and dropped practically to zero in the 11,000—11,500 kg/cm^2 range. With an increase in pressure from 12,000 to 18,000—20,000 kg/cm^2, the elongation again increased and the fracture became ductile, while above 20,000 kg/cm^2 the ductility dropped again

Card 1/2

L 49284-65
ACCESSION NR: AP5011530

and the fracture became brittle. Thus, the experimental results revealed a new phenomenon—the existence of pressure ranges within which a material can have a higher or a lower ductility. It is assumed that this phenomenon is associated with peculiarities of the ρ, T-diagram of the alloy. Orig. art. has: 2 figures. [MS]

ASSOCIATION: Institut fiziki zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Physics of the Earth, Academy of Sciences, SSSR)

SUBMITTED: 21Oct64 ENCL: 00 SUB CODE: MM

NO REF SOV: 008 OTHER: 004 ATD PRESS: 4005

BJB

Card 2/2

3C

L 24468-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(k) IJP(c) JD/HW/GS

ACC NR: AT6010571 (N) SOURCE CODE: UR/0000/65/000/000/0004/0028

44 43 B+1

AUTHOR: Martynov, Ye. D.; Veresnev, B. I.; Bulychev, D. K. Rodionov, K. P.; Ryabinin, Yu. N.

ORG: Institute of Physics of the Earth, AN SSSR, Moscow (Institut fiziki Zemli AN SSSR); Institute of Physics of Metals, AN SSSR, Sverdlovsk (Institut fiziki metallov AN SSSR)

TITLE: Effect of high pressure on ductility and fracture of metals

19 18

SOURCE: AN UkrSSR. Mekhanizm plasticheskoy deformatsii metallov (Mechanism of the plastic deformation of metals). Kiev, Naukova dumka, 1965, 4-28

TOPIC TAGS: pressure effect, material fracture, crystal defect, yield stress, ductility

ABSTRACT: The effect of pressure on ductility of metals is studied from the standpoint of origin and development of flaws in materials subjected to deformation. The specimens were placed in a chamber (cylinder) and subjected to high hydrostatic pressure P, followed by tensile force Q (see figure). Several types of metals were studied. Formulas are given for critical stresses and pressures in cases where the

2

Card 1/3

L 24468-66

ACC NR: AT6010571

joint action of plastic deformation and high pressure causes secondary changes in the metal such as recrystallization, phase transformations, etc. It is shown that high pressure retards or completely suppresses the process of crack formation during deformation. Healing of flaws during deformation of metals under high pressure is discussed. It is found that a flaw may be completely closed by the application of external pressure only when this flaw has an infinitely thin wall (i.e. when it touches the outside surface of the specimen). Otherwise infinite pressure is needed to heal the flaw. Theoretical analysis shows that extremely high pressures are necessary for healing flaws even when pressure and deformation are combined (several orders of magnitude greater than the yield stress of the material). However, experiments show that this conclusion does not correspond to the observed facts. The reason for this discrepancy is that the anisotropy of actual polycrystals is disregarded in the theoretical calculations. Experiments combining the effect of pressure and deformation showed that flaws are noticeably closed by pressures of the same order as the stress of the material. The differences between the behavior of a theoretical isotropic solid and an actual anisotropic polycrystalline material subjected to pressure and deformation are analyzed. Orig. art. has: 15 figures, 38 formulas.

Card 2/3

L 24468-66
ACC NR: AT6010571

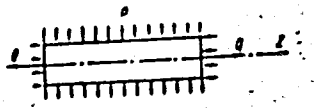

Fig. 1.

SUB CODE: 11 / SUBM DATE: 22Oct64/ ORIG REF: 012/ OTH REF: 007

Card 3/3 dda

L 00507-67 EWT(m)/EWP(t)/ETI/EWP(k) IJP(c) FDN/JD/IW (1)
ACC NR: AT6023763 (A,N) SOURCE CODE: UR/2755/66/000/005/0173/0188

AUTHOR: Martynov, Yo. D.; Boresnov, B. I.; Bulychev, D. K.; Yevstyukhin, A. I.; Rodionov, K. P.; Ryabinin, Yu. N. 37 34 B+1

ORG: none

TITLE: Apparatus for the extrusion of metals using a high pressure fluid 16

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Metallurgiya i metallovedeniye chistykh metallov, no. 5, 1966, 173-188

TOPIC TAGS: metal extrusion, high pressure extrusion, hydraulic fluid

ABSTRACT: The article gives design details of an extrusion apparatus of the the type shown in Fig. 2.

Card 1/3

L 09507-67
ACC NR: AT6023743

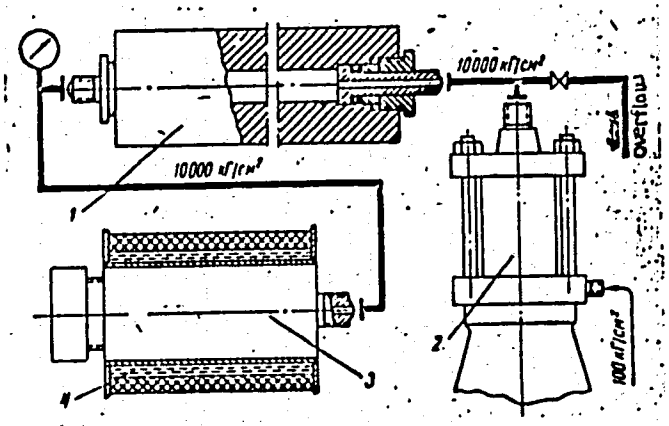

Fig. 2. Scheme of extrusion unit for pressure up to 12,000 kg/cm^2. 1—reservoir; 2—hydrocompressor; 3—container; 4—electric furnace

The unit consists basically of a container connected between a reservoir and a hydrocompressor, and a liquid-gas accumulator (not shown in Fig. 2). The article also

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L 09507-67
ACC NR: AT6023743

3

gives detailed drawings of the extrusion die and the container. It then passes on to a theoretical consideration of design calculations for high pressure vessels. Calculated results show that steels EI643, 45KhNMFA, and 15Kh2GN2TRA are suitable materials for fabrication of high pressure vessels, while with a vessel wall thickness greater than 100-120 mm, steels 33KhNZMA and 30KhGSNA are preferred. For work at temperatures from 300-500°C, steels 3Kh2V8, 40KhNMA, 23Kh2NVFA, and others can be used. "The work was done by coworkers of the Institute of Earth Physics AN SSSR (Institut fiziki Zemli AN SSSR), Moscow Engineering Physics Institute (Moskovskiy inghenergo-fizicheskogo institut), and Institute of Metal Physics AN SSSR (Institut fiziki metallov AN SSSR)." Orig. art. has: 10 formulas, 5 figures and 2 tables.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 009/ OTH REF: 002

Card 3/3 LC

ACC NR: AP7013702 SOURCE CODE: UR/0011/66/000/008/0003/0010

AUTHOR: Ryabinin, Yu. N.

ORG: Institute of Physics of the Earth im. O. Yu. Shmidt, AN SSSR, Moscow (Institut fiziki zemli AN SSSR)

TITLE: Some results of investigation of the properties of matter at high pressures and temperatures of interest for geophysics

SOURCE: AN SSSR. Izvestiya. Seriya geologicheskaya, no. 8, 1966, 3-10

TOPIC TAGS: geodynamics, high temperature effect, high pressure effect, mineralogy

SUB CODE: 08,20

ABSTRACT: Experimental studies of the possibilities of transformations of matter at pressures up to 135,000 atmospheres and temperatures up to 2,000°C are described. These correspond to conditions of the earth's upper mantle. For example, study of the behavior of enstatite at pressures from 40 to 135 kbar (in the temperature range from 400 to 1,600°C) revealed that at high temperatures the initial clinoenstatite experiences a transformation into a rhombic modification. After the experiment a petrographic and radio graphic study was made of the samples as well as optical measurements and density determinations. Although the experiments were made in a region in which

UDC: 552.11:551.12

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stishovite is synthesized, the decay of enstatite into forsterite and stishovite was not observed. Experiments made under these conditions with olivine revealed that no changes occurred other than recrystallization. Therefore, in the B layer, at depths of 200-400 km, the stable form of silica apparently is coesite because at the temperatures corresponding to these depths stishovite is unstable and is transformed into coesite. In the transitional layer of the earth's mantle (C) at depths greater than 400 km the conditions of stability of stishovite apparently already will be attained and the decay of enstatite into forsterite and stishovite with a large change of volume becomes possible. The pressure or temperature at which this transformation occurs is impossible to estimate because the stishovite-coesite equilibrium line is unknown. (This paper is subjected to severe criticism by I. A. Ostrovskiy in an article in this same issue of the journal, p. 11. In turn, the author rejects Ostrovskiy's conclusions in this new critique and in his earlier publications.) Experiments were carried out by collaborators of the IFZ laboratory of pressure processes by V. K. Markov, Yu. S. Genshtaf, L. D. Livshits, B. I. Berecnev and Ye. D. Martynov working with collaborators of IGEM, AN SSSR V. P. Petrov, I. S. Delitsin and V. V. Nasedkin. Orig. art. has: 2 figures. [JPRS: 40,106]

MARKOV, V.K.; LIVSHITS, L.D.; BELITSIN, I.S.; RYABININ, Yu.N.; PETROV, V.P.

Conversions in magnesium metasilicate under high pressures and temperatures. Izv. AN SSSR. Ser. geol. 30 no.7:38-49 Jl '65. (MIRA 18:7)

1. Institut fiziki Zemli AN SSSR, i Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moskva.

L 3400-66 EPA(s)-2/EWT(m)/EWP(w)/EPF(c)/EPF(n)-2/T/EWP(t)/EWP(b)
~~IJP(c) JD/JG~~

ACCESSION NR: AP5024209 UR/0020/65/164/003/0541/0544

AUTHORS: Livshits, L. D.; Beresnev, B. I.; Genshaft, Yu. S.; Ryabinin, Yu. N. 33 32 B

TITLE: Change in strength of several substances in the region of polymorphic transitions under pressure

SOURCE: AN SSSR. Doklady, v. 164, no. 3, 1965, 541-544

TOPIC TAGS: polymorphic transition, rubidium chloride, silver nitrate, limestone, calcium carbonate

ABSTRACT: The effect of pressure on RbCl, $AgNO_3$, and limestone was studied. The investigation is an extension of previous work on Bi-Sn alloys published by the authors (DAN, 161, 5, 1965). Axial compression of specimens was determined at high hydrostatic pressures. The specimens were of cylindrical shape, 8-10 mm in diameter, and had a length-to-diameter ratio of 1 to 1.5. Photographs of the deformed samples are presented and stress-strain curves are shown graphically (see Fig. 1 on the Enclosure). It is concluded that pressure affects the strength of different materials differently during polymorphic transitions. Thus the resistance to compression of RbCl increases with pressure, that of limestone

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L 3400-66

ACCESSION NR: AP5024209

increases also, but more slowly, and that of $AgNO_3$ shows a decrease with increase of pressure. Orig. art. has: 3 graphs and 1 photograph.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta, Akademii nauk SSSR (Institute of Geophysics, Academy of Sciences, SSSR)

SUBMITTED: 01Feb65 ENCL: 01 SUB CODE: SS

NO REF SOV: 003 OTHER: 001

Card 2/3

L 3400-66

ACCESSION NR: AP5024209

ENCLOSURE: 01

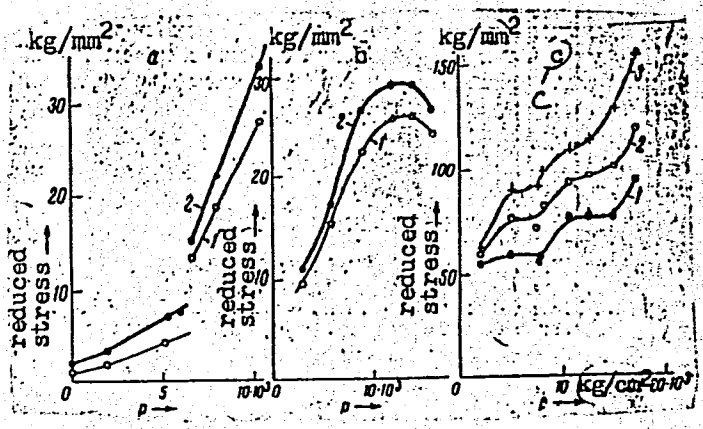

Fig. 1. Dependence of reduced stress on pressure for constant residual deformation (δ = const.). a- RbCl: 1 - δ = 3%; 2 - δ = 10%; b- $AgNO_3$: 1 - δ = 2%; 2 - δ = 10%; c- limestone: 1 - δ = 2%; 2 - δ = 5%; 3 - δ = 10%

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BERESNEV, B.I.; BULYCHEV, D.K.; GAYDUKOV, M.G.; MARTYNOV, Ye.D.; RODIONOV, K.P.; RYABININ, Yu.N.

Closing of pores and cracks in copper during extrusion with a high pressure liquid. Fiz.met. i metalloved. 18 no.5:778-783 N '64. (MIRA 18:4)

1. Institut fiziki metallov AN SSSR i Institut fiziki Zemli AN SSSR.

ADADUROV, G.A. (Moskva); DREMIN, A.N. (Moskva); RYABININ, Yu.N. (Moskva)

Behavior of certain substances under shock wave compression.
PMTF no.6:115-119 N-D '64 (MIRA 18:2)

RYABININ, Yu.N.

Effect of pressure on certain properties of substances. Izv. AN SSSR. Fiz. zem. no.1:42-48 '65. (MIRA 18:5)

1. Institut fiziki Zemli AN SSSR.

LIVSHITS, L.D.; BERESNEV, B.I.; RYABININ, Yu.N.

Plasticity of the alloy 50 at.% Bi - 50 at.% Sn under tension at high pressure. Dokl. AN SSSR 161 no.5:1077-1080 Ap '65. (MIRA 18:5)

1. Institut fiziki Zemli im. O.Yu.Shmidta AN SSSR. Submitted October 31, 1964.

VASILEVAKAYA, Vanda [Wasilewska,Wanda]; VASILEVSKAYA, E. [translated]; RYABININA, A., red.; YAKOVLEV, B., red.; TSINGOVATOVA, Ye., red.; TROSHIN, A., tekhn.red.

[Under the sky of China. Trnalated from the Polish] Pod nebom Kitaia. Moskva, Gos.izd-vo khudozh. lit-ry, 1953. 310 p. (MIRA 11:5)
(China--Description and travel)

RYABININA, A.A.

YUDIN, N.I.

3(8) PHASE I BOOK EXPLOITATION SOV/1575

Akademiya nauk SSSR. Sovet po izucheniyu proizvoditel'nykh sil

Ocherki osadochnykh mestorozhdeniy poleznykh iskopayemykh (Description of Sedimentary Mineral Deposits) Moscow, Izd-vo AN SSSR, 1958. 84 p. 5,000 copies printed.

Resp. Ed.: L.V. Pustovalov, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: O. I. Nosov; Tech. Ed.: S. G. Markovich

PURPOSE: This publication is intended for mining geologists, stratigraphers, petrographers, and mineralogists.

COVERAGE: This collection of articles is devoted to a description of several minerals found in Eastern Siberia, and a discussion of the conditions of their deposition by regions. Individual articles report on the Berezovskoye iron ore deposits, the titaniferous minerals of the Bakal'skoe deposit, the iron ore deposits of the Angaro-Pitskiy basin and the Khoperskiy region. The articles are accompanied by diagrams, tables, and bibliographic references.

Card 1/3

Card 2/3

AVAILABLE: Library of Congress

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Card 3/3

DMITRENKO, O.I.; RYABININA, A.A.

Reversion of electrolyte adsorption by ferrisilicate and aluminosilicate gels. Koll. zhur. 23 no.1:59-66 Ja-F '61. (MIRA 17:2)

1. Institut okeanologii AN SSSR, Moskva.

RYABININA, A.A.

(3)

Effect of accompanying electrolytes on the molecular adsorption of silver salts by mixed gels of silicic acid and hydroxides of iron and aluminum. O. J. Dmitrenko and A. A. Ryabinina (Geol. Inst., Acad. Sci. U.S.S.R., Moscow). Kolloid. Zhur. 15, 20-36(1953); cf. C.A. 45, 3088d.—More of Ag^+ was adsorbed from an acetate buffer (pH 4.03) than from a $AgNO_3$ soln. at the same pH. This was due to formation of AgOAc which is less sol. and, hence, better adsorbed than $AgNO_3$. The adsorption from a soln. of AgOAc only was even greater because in the reaction between $AgNO_3$ and acetate buffer HNO_3 formed. Adsorption of Ag_2SO_4 is greater still. This inverse relation between adsorption and soly. shows that mols. rather than ions are adsorbed. $Fe_2O_3.2SiO_2$ and $Al_2O_3.2SiO_2$ were used as adsorbents. The latter compd. was prepd. from $Al(NO_3)_3$, $AlCl_3$, or $Al_2(SO_4)_3$, and the adsorptive properties of the 3 specimens were identical. Mol. adsorption is possible also on impure surfaces, but the extent of adsorption is affected by electrodialysis. J. J. Bikerman

11-54 mcf

RYABININA, A.I.

Efficient method of determining the ripeness of viscose. Khim. volok. no.1:49 '60. (MIRA 13:6)

1. Kalininskiy kombinat.
(Viscose)

RYABININA, A.I.; PAVLOVICH, V.A.

Factory testing laboratory. Khim.volok. no.1:68 '60.
(MIRA 13:6)

1. Kalininskiy kombinat.
(Kalinin--Textile fibers, Synthetic)
(Testing laboratories)

RYABININA, A.I.; PANOVA, L.N.

Causes of bright and dull lusters of viscose silk. Khim.volok. no.5:73-74 '59. (MIRA 13:4)

1. Kalininskiy kombinat.
(Rayon)

AUTHORS: Ryabinina, A. I., Pavlovich, V. A. S/183/60/000/01/027/031
B004/B014

TITLE: An Industrial Research Laboratory

PERIODICAL: Khimicheskiye volokna, 1960, Nr 1, p 68 (USSR)

TEXT: One year ago a research laboratory was established at the Kalininskiy kombinat (Kalinin Kombinat), which is one of the main centers of the VNIIV (Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna - All-Union Scientific Research Institute for Synthetic Fibers). The laboratory studies the development and introduction of new technical procedures, improvement of existing techniques, elimination of shortcomings, and training of engineers in research work. First, the collaborators of the research laboratory had to make themselves familiar with the conventional analytical methods, study technical procedures, and enlarge their knowledge, especially by learning foreign languages. For this purpose they were sent to other factories manufacturing synthetic fibers, to the VNIIV, to Eastern Germany and Czechoslovakia. Systematic consultation on theoretical problems was introduced in the Kombinat by Professor A. B. Pakshver of the branch of the VNIIV. Since October 1959, all co-workers of the laboratory have been working at the Universitet propagandy nauchno-tekhnicheskikh znaniy (University for the Dissemination of Scientific

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and Technical Knowledge) which was organized by the Kalininskiy sovet narodnogo khozyaystva (Kalinin Council of National Economy). 33 research problems of practical importance were treated in 1959, including the determination of iron impurities in viscose in the various phases of viscose production; elaboration of the most favorable operational conditions for sulfurization in kneading machines; setup of a balance of carbon disulfide for the production of viscose; introduction of a continuously operating deaeration unit and reduction of the air content of viscose; introduction of a single-stage twisting frame; regeneration of zinc from industrial waste water; elaboration of the operational conditions for the production of silk on Maurer machines; improvement of the quality of viscose cord. Several engineers (P. I. Nivin, A. S. Gerasimova, T. N. Trusova, Ye. N. Izyumova) work in brigades of the VODGEO and VNIIV and its branch. Among other things, it is intended to improve in 1960 the quality of viscose produced on VA units. The Kalinin sovnarkhoz and the Gosudarstvennyy komitet soveta ministrov SSSR po khimii (State Committee on Chemistry of the Council of Ministers of the USSR) should support the laboratory in the delivery of test apparatus in order to develop it into a research center.

ASSOCIATION: Kalininskiy kombinat (Kalinin Kombinat)

Card 2/2

VISHNYAKOVA, Ye.S., inzh.; RUMYANTSEVA, N.F., inzh.; BORONICHEV, G.A., inzh.; PITINOVA, L.V., inzh.; PETRUNIN, N.I., inzh.; MESKIN, I.M., inzh.; ANDREYEVA, L.P., inzh.; BISHENKEVICH, G.V., inzh.; RYABININA, A.I., inzh.; MOSHNIN, N.S., red. gazety; KOMKOV, A.I., otv. red.; YUNITSKIY, V.P., red.; FLIGEL'MAN, S.M., red.; ROZHDAYKINA, V., tekhn. red.

[Kalinin Artificial Fiber Combine]Kalininskii kombinat iskusstvennogo volokna. Kalinin, Kalininskoe knizhnoe izd-vo, 1960. 92 p. (MIRA 15:8)

1. Kalininskiy kombinat iskusstvennogo volokna (for all except Komkov, Yunitskiy, Fligel'man, Rozhdaykina).
(Kalinin--Textile fibers, Synthetic)

83873
S/112/59/000/016/054/054
A052/A002

24.1800

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 16, p. 247, # 35366

AUTHORS: Bykova, Z. K., Ryabinina, G. A., Grinshteyn, Z. B.

TITLE: Application of Ultrasound to the Inspection of Uniformity of Metal

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Chelyab. ekonom. adm. r-na, 1958, No. 7, pp. 65-67

TEXT: A report on the use of the УЗД-7Н (UZD-7N) ultrasonic flaw detector at the Zlatoust "imeni Lenin" plant is given. The inspection of shafts and cranks of presses as well as other cylindrical parts is performed by a 2-feeler method (the feelers are arranged 2-5 mm from each other). The prisms in prismatic feelers are replaced by plexiglas tips whose bases are shaped according to the radius of the part. At the maximum sensitivity it is possible to detect defects of 0.15mm in diameter. For parts of spherical or conical shape an ultrasonic immersion flaw detector (without a direct contact between the feeler and the part) has been developed. An open feeler is used which is fixed at a certain angle

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83873

S/112/59/000/015/054/054
A052/A002

Application of Ultrasound to the Inspection of Uniformity of Metal

found by trial. A part can revolve about its axis which facilitates locating the defect.

M. M. P.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

RYABININA, E.D.

KAPELINSKIY, Yu.N.; POLYANIN, D.V.; MENZHINSKIY, Ye.A.; IVANOV, I.D.; SERGEYEV, Yu.A.; KOSTYUKHIN, D.I.; DUDUKIN, A.N.; IVANOV, A.S.; FINOGENOV, V.P.; ZAKHMATOV, M.I.; SOLODKIN, R.G.; DUSHEN'KIN, V.N.; BOGDANOV, O.S.; SEROVA, L.V.; GONCHAROV, A.N.; KARKHIN, G.I.; LYUBSKIY, M.S.; PUCHIK, Ye.P.; SEROVA, L.V.; KAMENSKIY, N.N.; SABEL'NIKOV, L.V.; FEDOROV, B.A.; GERCHIKOVA, I.N.; KARAVAYEV, A.P.; KARPOV, L.N.; SHIPOV, Yu.P.; VLADIMIRSKIY, L.A.; KUTSENKOV, A.A.; RYABININA, E.D.; ANAN'YEV, P.G.; ROGOV, V.V.; BELOSHAPKIN, D.K.; SEYFUL'MULYUKOV, A.M.; PARFENOV, A.Ya.; SMIRNOV, V.P.; ALEKSEYEV, A.F.; SHIL'DKRUT, V.A.; CHURAKOV, V.P.; BORISENKO, A.P.; ISUPOV, V.T.; ORLOVA, N.V., red.; GORYUNOVA, V.P., red.; BELOSHAPKIN, D.K., red.; GEORGIYEV, Ye.S., red.; KOSAREV, Ye.A., red.; KOSTYUKHIN, D.I., red.; MAYOROV, B.V., red.; PANKIN, M.S., red.; PICHUGIN, B.M., red.; POLYANIN, D.V., red.; SOLODKIN, R.G., red.; UFIMOV, I.S., red.; EKHIN, P., red.; SMIRNOV, G., tekhn.red.

[Economy of capitalist countries in 1957] Ekonomika kapitalisticheskikh stran v 1957 godu. Pod red. N.V.Orlova, IU.N.Kapelinskogo i V.P.Goriunova. Moskva, Izd-vo sotsial'no-ekon.lit-ry, 1958. 686 p. (MIRA 12:2)

1. Moscow. Nauchno-issledovatel'skiy kon"yunkturnyy institut. (Economic conditions)

GLEYM V.G.; GUIDLOVSKIY, B.B.; RYABININA, G.B.

Elementary foam at elevated pressure. Zhur.prikl.khim. 37 no.1:209-211 Ja '64. (MIRA 17:2)

SOV/137-59-2-4066

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 2, p 250 (USSR)

AUTHORS: Bykova, Z. K., Rvabinina, G. A., Grinshteyn, Z. B.

TITLE: Application of Ultrasonics for the Control of the Continuity of a Metal (Primeneniye ul'trazvuka dlya kontrolya sploshnosti metalla)

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Chelyab. ekon. adm. r-na, 1958, Nr 7, pp 65-67

ABSTRACT: The authors present the methods developed and used in industry for the ultrasonic inspection of rods and crankshafts of presses on the absence of metallurgical flaws (internal gas bubbles, shrinkage porousness, and slag inclusions). The control of the continuity of manufactured articles is carried out on the UZD-7N flaw detector either by the method of reflection from the flaw (first method) or by inertial ultrasonic flaw detection (second method), in which latter the acoustical contact is achieved through immersion of the probe and the article tested into a transformer-oil bath. In the first method the article is coated with transformer oil to achieve a better acoustical contact. When the apparatus is tuned to maximum sensitivity it is possible to detect flaws with linear dimensions of 0.15 mm in cross section. The

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Application of Ultrasonics for the Control of the Continuity of a Metal

second method is usually employed for the inspection of non-cylindrical articles. The authors point out that ultrasonic flaw detection is more reliable and efficient and less labor consuming than the methods formerly employed. The employment of ultrasonic flaw detection, with the apparatus properly tuned, makes it possible to establish the magnitude of admissible flaws that have no effect on the operation of the machine parts by the height of the impulse coming from the flaw.

Z. F.

ACCESSION NR: AP4010492 S/0080/64/037/001/0209/0211

AUTHORS: Gleym, V.G.; Shidlovskiy, B.R.; Ryabinina, G.B.

TITLE: Elementary foam at elevated pressures

SOURCE: Zhurnal prikladnoy khimii, v.37, no.1, 1964, 209-211

TOPIC TAGS: Foam, pressure effect, bubble dimensions, vapor loss, moisture loss

ABSTRACT: The change in the geometrical dimensions of bubbles with change in pressure is one of the factors in determining the time that a gas or vapor bubble (the elementary foam unit) exists at the surface of a liquid. Studies at 1 and 7 atmospheres pressures show that the length of time a bubble exists is independent of the pressure, decreases with decrease in its dimensions, and increases with contamination of the solution (colloidal Fe or Cr compounds); bubble dimensions are an inverse function of the pressure at which they are formed. For air bubbles on a glycerin surface the following relationship exists: $r = \frac{10.66}{P}$, where r is the radius of the bubble in mm.,

Card 1/2

ACCESSION NR: AP4010492

and P is the pressure in atm. The bubble radius--pressure curve is shown in Fig.1. This information can be useful in calculating moisture loss with vapors of high and ultra-high parameters. Orig. art. has: 3 figures and 2 equations.

ASSOCIATION: None

SUBMITTED: 20Jun62 DATE ACQ: 14Feb64 ENCL: 01

SUB CODE: PH NR REF SOV: 003 OTHER: 000

Card 2/2